

Integrating Telephony - Developers Guide

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Portrait Foundation Integrating Telephony - Developers Guide

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Portrait Software was acquired in July 2010 by Pitney Bowes to build on the broad range of capabilities at Pitney Bowes Software for helping organizations acquire, serve and grow their customer relationships more effectively. The Portrait Customer Interaction Suite combines world leading customer analytics, powerful inbound and outbound campaign management, and best-in-class business process integration to deliver real-time customer interactions that communicate precisely the right message through the right channel, at the right time.

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About this document

Purpose of document

This document summarises the approach to integrating Portrait Foundation using the Portrait Telephony Server with CTI products and related telephony systems.

Intended audience

People responsible for integrating telephony with Portrait Foundation.

Related documents

Technical Architecture

Software release

Portrait Foundation 3.1 or later.

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1 Introduction

This document serves to identify the integration points between the Portrait Telephony Server (PTS) and vendor-specific CTI middleware products from companies such as Genesys, Cisco, Avaya and Aspect.

It also outlines the implementation steps involved in developing for a middleware variant not currently supplied with Portrait Foundation.

The PTS only supplies integration with Genesys, using the T-Server API (T-Library). The range of supported sub-systems may be extended in future releases of the product.

CTI areas covered

Over the years, the use of the term CTI has evolved to sometimes refer to a variety of areas and features such as:

- Agent call control, allowing the agent to control a telephone call from within the desktop applications, and also access call information such as the number the caller has dialled from (CLI or ANI), the number the caller dialled (DNIS) – **typically to enable 'screen pop' of the application for the relevant business area or caller's details.**
- Interactive Voice Response (IVR) applications that provide automated speech and tone based applications for callers.
- Predictive diallers and telephone based campaign management systems.
- Voice recording and playback.
- Network based services (intelligent routing across multiple sites) or other functions.

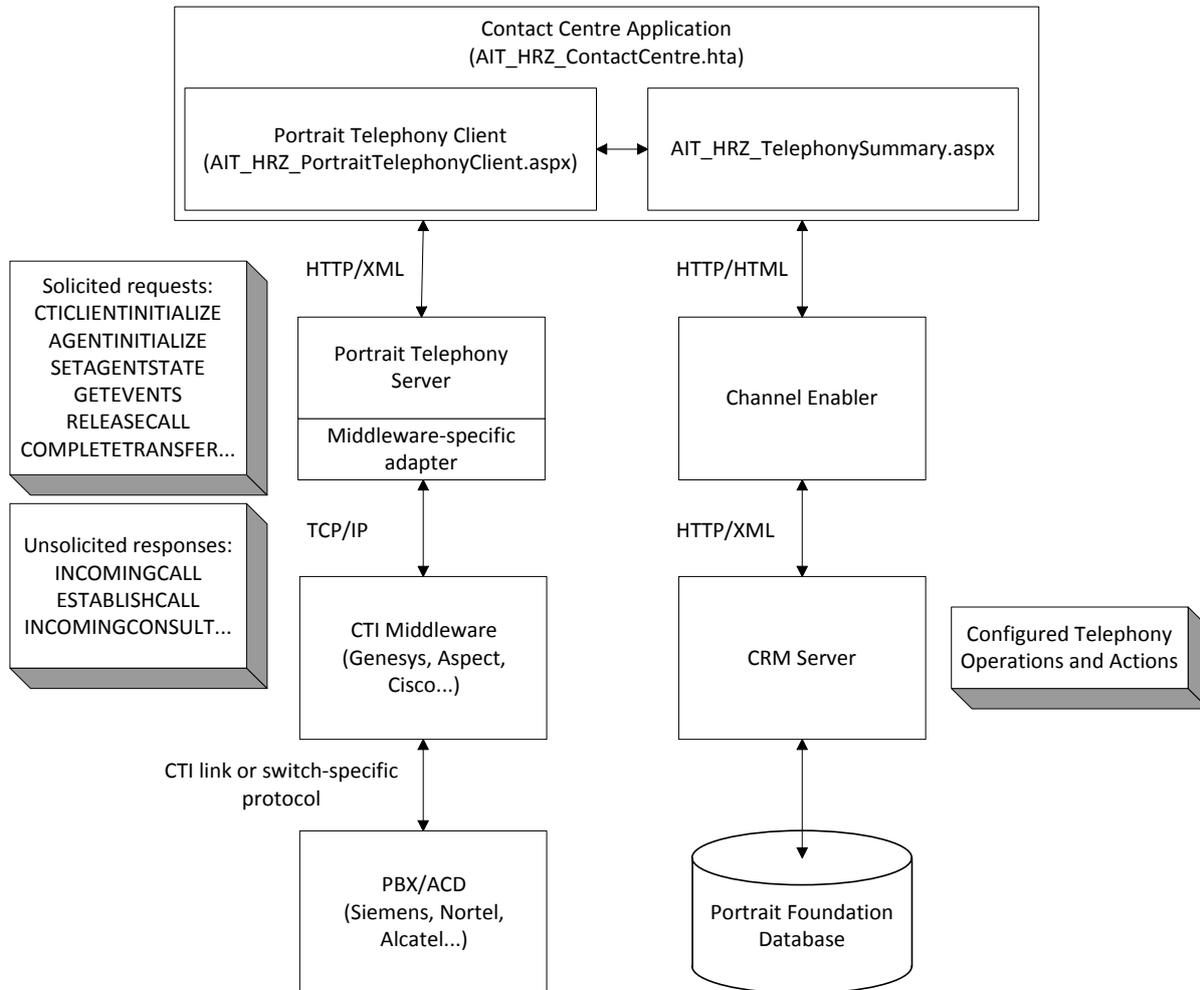
This document currently focuses only on the first item – **Agent call control**. Other integrations can be achieved for IVR or Predictive diallers (e.g. feeding call lists) but fall into other areas of the Portrait Foundation architecture. For example, an IVR system would typically be another Portrait Foundation Channel and supported by a channel enabler and also may make use of the PTS for telephony control – calling into the Portrait Foundation process server for retrieving and updating customer or product data, issuing transactions and maintaining the relevant engagement history.

2 Portrait telephony architecture

2.1 Overview

- The diagram below illustrates the telephony architecture for Portrait Foundation.

Figure 1 - Telephony architecture



2.1.1 Key components

The key components in the system, from a telephony or CTI perspective, are:

- Portrait Telephony Client (PTC) residing in a hidden frame in the Contact Centre application. This is implemented in JavaScript and runs on the client. It needs no additional software other than that provided by the Internet Explorer Web browser.
- Portrait Telephony Server (PTS), implemented as a service running on a dedicated server. It comprises both a generic framework and CTI middleware-specific implementation classes. It has been developed with portability in mind, should a non-Windows version be required in future.
- CTI middleware from a company such as Genesys, Cisco, Aspect or Avaya.
- The physical hardware that is the telephony switch or Automatic Call Distributor (ACD) as provided by a vendor such as Nortel, Aspect, Rockwell or Avaya.

2.1.2 Key concepts

In terms of integration, the architecture supports the following key concepts:

- As standard, the Portrait Contact Centre application requires no additional downloads or plug-ins to support CTI.
- The Portrait Telephony Client(PTC)/Portrait Telephony Server(PTS) support a defined set of requests and responses using XML over HTTP, thus abstracting the client from needing to know specifics of the telephony subsystem such as the middleware vendor or switch manufacturer.
- The event handling mechanism between PTC and PTS supports a combination of synchronous and asynchronous CTI events. As such, no assumptions are made about communication between the PTS and CTI middleware.

2.2 Supported functionality

The combination of the PTC and PTS provide support for a defined set of XML requests and responses relating to specific CTI functions. These have been designed to meet the basic requirements for telephony and its integration to Portrait Foundation. They do not form an exhaustive list of possible functionality and can be extended if additional features are required for a specific project or implementation.

Table 1 - Supported requests and responses

Request / Response	Description
CTICLIENTINITIALIZE/CTICLIENTUNINITIALIZE	Initialize or register with CTI middleware
AGENTINITIALIZE/AGENTUNINITIALIZE	Agent logon/log off
CTICLIENTRECONNECT	Reconnects with CTI middleware following down time
SETAGENTSTATE	Make agent available/unavailable for calls
MAKECALL	Make an outbound call to a destination
ACCEPTCALL	Accept an incoming call
RELEASECALL	Hang up an active call
HOLDCALL	Put active call on hold
RETRIEVECALL	Retrieve call from hold
INITIATETRANSFER	Consult with 3rd party regarding a call transfer, while placing active call on hold
COMPLETETRANSFER	Transfer call to party currently being consulted
CANCELTRANSFER	End transfer consult
INITIATECONFERENCE	Consult with 3rd party regarding conference call, while placing active call on hold
CANCELCONFERENCE	End conference consult
COMPLETECONFERENCE	Establish a conference call

Request / Response	Description
BLINDTRANSFER	Transfer a call without consultation
GETEVENTS	Retrieve events, solicited or unsolicited, for a given client
INCOMINGCALL	Unsolicited event generated on receipt of an incoming call
ESTABLISHCALL	Unsolicited event generated on accepting an incoming call
INCOMINGCONSULT	Unsolicited event generated on receipt of an incoming consult
INCOMINGBLINDTRANSFER	Unsolicited event generated on receipt of an incoming blind transfer
CALLABANDONED	Unsolicited event generated on receipt of a call that has been hung up before it was answered.

Associated Call Data

The Portrait telephony system supports 'Call attached data' enabling screen-pop or other features to be used within a Portrait Foundation application, based on CLI/ANI, DNIS or data supplied by an IVR system or during an agent-agent transfer.

2.2.1 Current limitations

It is important to be aware of some limitations that currently apply to Portrait telephony: Many of these are in various stages of design and development and likely to be addressed in forthcoming releases of Portrait Foundation.

- Get Statistics, Mute Call, and Do Not Disturb are not currently supported.
- The socket communication between the PTC and PTS is not currently encrypted.
- The PTS does not support authenticating users/clients.

Please contact Product Support should you have specific requirements in mind and require latest information.

3 Integration details

3.1 Integration points

The integration points for telephony in Portrait Foundation are:

- Telephony actions (requests that can be made of telephony via the PTC) and operations (models configured under the category of telephony) are configured using the Portrait Configuration Suite.
- Telephony requests are made of the PTC, via the Contact Centre application. The PTC then forms an XML message to send to the PTS. Events, either solicited or unsolicited, are received from the PTS in the form of XML. The PTC processes the events and performs the necessary action such as starting an operation or notifying the user of the event.
- The PTS performs the necessary translation between CTI middleware requests/responses and the XML requests/responses that the PTC recognises. Additionally it maintains a session for each connected PTC and the current call and agent state information.

The key dependency for Portrait telephony from an integration perspective is between the PTS and the CTI middleware.

3.2 PTS Configuration

The PTS reads its configuration information from the registry. These entries fall into generic and middleware-specific categories. A new configuration section is required for another CTI middleware variant. These are added by the Core Software install.

3.2.1 Generic registry keys

HKLM\Software\PST\Portrait\Telephony

implementation	Location of the CTI middleware variant PTS adapter.
installed	Is PTS installed.
listener_port	TCP port that PTS listens for PTC requests on.
log_level	Level of logging messages required (1-5, Error to Debug).
loglocation	Target directory for PTS logs.
notify_listener_port	TCP port for notification of configuration changes (not used yet).
socket_timeout	Time in seconds before idle socket connections are automatically closed.

HKLM\Software\PST\Portrait\Telephony\num_threads

outgoing_pool	Number of PTS threads handling events from CTI middleware.
incoming_pool	Number of PTS threads handling requests from PTCs.

Note that any specific integration adapter will typically have an additional set of registry settings.

3.3 Middleware-specific adapters

To integrate to third-party CTI middleware, an adapter needs to exist to support it. These adapters are developed as .dll's that plug in beneath the generic framework provided by the PTS. An adapter .dll is loaded by the PTS during start-up.

3.3.1 Common implementation approach

The PTS separates generic and middleware-specific functionality through the combined use of functions exported by a module-definition (.def) file and polymorphic request and response objects accessed via abstract base classes.

3.4 Genesys integration

In the case of Genesys, the PTS utilises the Genesys T-Server API (T-Library) for integration.

To achieve this, the following PTS classes are used:

- **CAmcCTIRequestImpBase** Abstract base class for handling PTC requests.
- **CAmcCTIResponseImpBase** Abstract base class for handling middleware responses.

The following Genesys classes have been developed:

- **CAmcCTIRequestImpGenesys** Genesys specific implementation of the PTC request object.
- **CAmcCTIResponseImpGenesys** Genesys specific implementation of middleware response object.
- **CAmcCTIServerImpGenesys** Genesys specific server object that maintains the connection with the Genesys T-Server, establishes an event handler and notifies the PTS as to the state of the server.

3.4.1 Genesys specific registry keys

When using the Portrait-Genesys integration, the adapter requires the following registry keys to be set.

HKLM\Software\PST\Portrait\Telephony\Genesys\CTIServer

host	Name or IP address of Genesys Tserver.
port	TCP port for Genesys Tserver.
resp_timeout_sec	Time in seconds to wait for Tserver response.

3.5 Planning for other integrations

In targeting another CTI middleware variant such as Cisco, Avaya or Aspect, equivalent classes will need to be developed and compiled as a .dll with the defined functions exported.

As a rule of thumb, when developing a new PTS adapter:

- Allow approx 60 days development time for a new PTS adapter (assuming familiarity with CTI in general). The lead time can be reduced through programming in pairs or similar.
- Allow for an 80/20 split between development of the new PTS adapter and on-site testing, assuming it has been developed against an emulator or test rig.

3.5.1 Other considerations

- It is possible, if required, to integrate at the client (changing the PTC and removing the PTS from the solution). This would require changes to standard Portrait Foundation JavaScript files shipped with the Product. Contact Product Support if this option is required.
 - Note this means that there will be components needing installation on **each client/agent PC, and typically only '1st party' call control functions** would be available.
- Be aware that the overall operation of the ACD, CTI middleware and Portrait Foundation components in any particular production environment can vary depending on ACD/switch software level, call vector set-up, ACD CTI link version, middleware version and other factors. It is strongly recommended that time is allocated for full on-site testing and tuning of the system even where standard Portrait Foundation components and integrations are being used.
- Currently the link between the PTC and the PTS is not encrypted. Though this could be run over SSL, the PTS does not currently implement the SSL protocols within its HTTP service. It is unlikely that this will be an issue as **little if no 'business data' is carried in this link other than CLI, DNIS and other call-data in transfers (normally reference ID's rather than the data itself)**

3.6 Security pre-requisites for Portrait Telephony Server

In the standard implementation, Portrait Telephony Client (PTC) is implemented within the JavaScript file downloaded to client workstation from Portrait Web Server. (PWS). In order to integrate to the telephony infrastructure, PTC needs to create an HTTP connection to Portrait Telephony Server (PTS). Within the context of Internet Explorer, such communication is referred to as cross-domain data access. When browsing the content of unknown and non-trusted sites, cross-domain data access may pose significant security risks. Therefore, Internet Explorer default security settings for Internet and Intranet zone prohibit such script activity.

In the case of CTI-enabled Portrait implementation, cross-domain data access is desired behaviour, as it enables communication of Portrait Foundation agent with telephony infrastructure. As such, the ability to perform cross-domain data access forms the pre-requisite of Portrait CTI deployment.

Portrait Software recommends that, in order to enable cross domain data access in most secure way, the deployment environment owners ensure that

- all Portrait Web Server URLs used by a particular environment are added into Trusted Sites security zone in the Internet Explorer security settings on client workstations belonging to this environment
- the security policy for Trusted Sites security zone enables cross-domain **data access (see "Access data across domains" setting within Portrait_Installation_Guide.pdf)** – at the time of writing this document this was the default installation setting

Various system management tools allow distribution of the above settings to agent workstations. The Internet Explorer Administration Kit (IEAK) is the systems management tool Microsoft recommends for such tasks.

Important note: By adding Portrait Web Servers into Trusted Sites security zone, the whole content of the servers is going to be trusted by particular client workstation. This step should, therefore, be made in line with reviewing the content and security policies of incriminated web servers. The impact on other trusted sites within agent workstation configuration should also be considered. Portrait Software cannot be held responsible for the damage caused by inappropriate web server security mechanisms or third party content hosted on the same web server.

Figure 2 - Security Settings

